Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for manufacturing a single electron device, comprising:

patterning a substrate;

providing passivated metallic nanoclusters; and

electro-migrating the passivated ~~metal~~ metallic nanoclusters by forcing the passivated metallic nanoclusters to assemble over the patterned substrate under control of a non-homogeneous electric field.

2. (Previously Presented) The method according to claim 1 wherein the electro-migrating step and a desired location of the metallic passivated nanoclusters are controlled by a dielectrophoretic process.

3. (Currently Amended) The method according to claim 1 including:

synthesizing passivated metallic nanoclusters surrounded by a dielectric shell of thiols of controlled size;

depositing the passivated metallic nanoclusters by dielectrophoresis, wherein the passivated metallic nanoclusters join together in a one-dimensional array; and

sintering the ~~nanoclusters~~ one-dimensional array to desorb the dielectric shell and provide a nanowire.

4. (Previously Presented) The method according to claim 3 wherein said synthesizing step includes:

synthesizing active metal to produce a metallic suspension comprising metallic nanoclusters;

superficially passivating the metallic nanocluster with thiol to provide passivated metallic nanoclusters; and

extracting and purifying the thiol-passivated metallic nanoclusters.

5. (Previously Presented) The method according to claim 4 wherein said step of synthesizing the active metal includes:

1st stage *Crystallized metal compound → intermediate phase*

- progressively dissolving a metal compound in a polyol to form a first solution;
- precipitating an intermediate phase from said first solution; and
- removing water by distillation from said intermediate phase;

2nd stage *Intermediate phase → metal*

- dissolving the intermediate phase in a polyol to form a second solution;
- reducing the intermediate phase in solution;
- removing volatile products of reaction; and
- spontaneously nucleating and growing metallic nanoclusters from said second solution.

6. (Original) The method according to claim 4 wherein said step of superficially passivating a metal with thiol includes cooling the metallic suspension and treating it at room temperature with a dodecanthiol ($CH_3(CH_2)_{11}SH$) solution or with a thiol excess ($CH_3(CH_2)_nSH$).

7. (Previously Presented) The method according to claim 4 wherein said extracting step includes separating said metallic nanoclusters by extraction with hydrocarbon (wet-way process).

8. (Previously Presented) The method according to claim 1 wherein the electro-migrating step forces the passivated metallic nanoclusters to assemble into a nanowire over said patterned substrate by forming a nanocontact under control of the electric field, and using the nanocontact as a target that offers a reference point for growing said nanowire by moving the nanoclusters under the control of the electric field.

9. (Previously Presented) The method according to claim 8 wherein said step of forming a nanocontact comprising:

patterning a substrate to obtain a metallic layer between two oxide layers, with a free face of the metallic layer being available for electro deposition; applying the electric field between a flat panel and the metallic free face, to cause one of the passivated nanoclusters, having a size comparable to a thickness of the metallic layer and being passivated with a dielectric shell of thiols, to move to the free face, under dielectrophoresis; and

heating the substrate until a degradation temperature of the thiols is reached, thereby causing the dielectric shell, surrounding a metal core of the one of the passivated nanoclusters, to vanish and leave a nanoparticle that finds stability by joining the free face.

10. (Original) The method according to claim 1 wherein the electro-migrating step is performed at room temperature.

11. (Currently Amended) A method of manufacturing a nanocluster device, comprising:

forming conductive nanoparticles; and

forming a nanocluster contact at a first electrode by forcing the conductive nanoparticles to the first electrode under control of a non-homogeneous electric field produced by a second electrode.

12. (Currently Amended) The method of claim 11, further comprising:

passivating the conductive nanoparticles with dielectric shells; and

heating the conductive nanoparticles to remove the dielectric shells after the passivated nanoparticles are forced to the first electrode.

13. (Currently Amended) The method of claim 12 wherein the passivating step includes superficially passivating the ~~metal~~ conductive nanoparticles with thiol and extracting and purifying the thiol-passivated nanoparticles.

14. (Currently Amended) The method of claim ~~13~~ 11 wherein forming the conductive nanoparticles includes:

progressively dissolving a crystallized metal compound

precipitating an intermediary phase;

evolving water by distilling the intermediate phase;

dissolving the intermediate phase;

reducing the intermediate phase in solution;

evolving volatile products of reaction; and

spontaneously nucleating and growing the metallic nanoparticles.

15. (Currently Amended) The method of claim 13 wherein the step of superficially passivating the ~~metal~~ conductive nanoparticles with thiol includes cooling ~~the~~ a metallic suspension comprising the conductive nanoparticles and treating ~~it~~ said metallic suspension at room temperature with a dodecanthiol ($CH_3(CH_2)_{11}SH$) solution or with a thiol excess ($CH_3(CH_2)_nSH$).

16. (Currently Amended) The method of claim 1 wherein the electro-migrating steps includes forming on an electrode a nanocontact under control of the electric field, and thus using the nanocontact as a target that offers a reference point for growing a nanowire by moving the nanoclusters under the control of the non-homogeneous electric field.

17. (Original) The method according to claim 11, further comprising:

forming a substrate that includes an upper, first dielectric layer;

forming the first electrode on the first dielectric layer;

forming a second dielectric layer on the first electrode and having an opening that exposes a free face of the first electrode; and

forming the second electrode facing the opening in the second dielectric layer.

18-23. (Canceled).

24. (Previously Presented) The method of claim 5 wherein said metal compound is a metal hydroxide, metal oxide or metal salt.

25. (Previously Presented) The method of claim 5 wherein the polyol is ethylene glycol (EG) or diethylene glycol (DEG).

26. (Currently Amended) The method of claim 4 wherein the step of superficially passivating said metallic nanoclusters comprises:

suspending said metallic nanoclusters in a third solution; and

adding thiol compounds to said third solution wherein the thiol ~~molecules~~ compounds are chemically absorbed to ~~the~~ surfaces of the metallic nanoclusters.

27. (Previously Presented) The method of claim 26 wherein the thiol compounds are dodecanthiol ($CH_3(CH_2)_{11}SH$) or a thiol excess having the formula $CH_3(CH_2)_nSH$, wherein n is an integer.

28. (Previously Presented) The method of claim 27 wherein n is an integer between 2-30.

29. (Previously Presented) The method of claim 26 wherein said third solution comprises polyvinylpoyrrolidone (PVP) as a reducing agent and inhibitor of aggregation processes of the nanoclusters.

30. (Currently Amended) The method according to claim 4 wherein said extracting step includes separating said passivated metallic nanoclusters by adding water following filtration (dry-way process).

31. (Previously Presented) The method of claim 4 wherein the purification process including:

dissolving the extracted passivated metallic nanoclusters in ethyl alcohol,

adding acetone to precipitate the passivated metallic nanoclusters,

separating the passivated metallic nanoclusters by centrifugation; and

drying the passivated metallic nanoclusters.

32. (Previously Presented) The method of claim 9 wherein the step of patterning the substrate comprises forming a plurality of electrodes surrounding a central aperture, each electrode having an opening exposing a free face.

33. (Previously Presented) The method of claim 32 wherein the central aperture is rectangular and the electrodes are substantially centrally located with respect to the sides of the central aperture.

34. (Currently Amended) The method of claim 32 further comprising applying a potential difference between the ~~four~~ plurality of electrodes and a plate electrode, held to a same potential, wherein, the passivated metallic nanoclusters are obliged to migrate towards the free faces of said electrodes and to self-assemble perpendicular to the free faces and forming a plurality of nanowires.

35. (Previously Presented) The method according to claim 34 wherein said step of forming said nanowires leave a gap between the nanowires defining a location for a quantum dot as single electron components.

36. (Previously Presented) The method according to claim 35 wherein the step of applying said electric field allows a nanoclusters occupy said gap as a quantum dot.

37. (Currently Amended) A method of manufacturing a single electron device, comprising:

patterning a substrate to provide an integrated microcavity, said integrated microcavity being substantially rectangular and surrounded on four sides by metal contacts, and

forming a nanowire within the integrated microcavity.

38. (Previously Presented) The method of claim 37 wherein said step of forming an integrated microcavity including:

forming a thin silicon oxide layer on a silicon substrate;

depositing metal contacts on said silicon oxide layer, in such a way to form a central aperture between said metal contacts;

forming a sacrificial layer to fill said central aperture and to cover at least portions of said metal contacts;

growing said thin silicon oxide layer to form a thick silicon oxide layer laterally of said sacrificial layer and on said metal contacts; and

removing said sacrificial layer to provide said integrated microcavity.

39. (Currently Amended) The method of claim 38 further comprising forming a plate electrode on said thick silicon oxide layer and above said central aperture to close said integrated microcavity.

40. (Currently Amended) The method of claim 37 wherein the step of forming a nanowire within the integrated microcavity comprises:

providing passivated metallic nanoclusters having thiol dielectric shells,

causing one passivated metallic nanocluster to move to a free face of one of the metal contact to provide a nanocontact under control of dielectrophoresis;

heating the substrate to degrade the thiol dielectric shell of the nanocontact, thereby attaching the passivated metallic nanocluster to the free face;

forming the nanowire under dielectrophoresis by forcing the passivated metallic nanoclusters to migrate and assemble into a one-dimensional array between the nanocontact and a free face of an opposite metal contact; and

heating the substrate to degrade the thiol dielectric shell of each passivated metallic nanoclusters.

41. (Currently Amended) The method of claim 37 wherein the forming step includes applying a non-homogeneous electric field to cause the passivated metallic nanoclusters to migrate within the integrated microcavity.